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EXAMINER

RUGGLES, JOHN S

ART UNIT	PAPER NUMBER
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1756

DATE MAILED: 11/18/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/608,639

Applicant(s)

KANG ET AL.

Examiner

John Ruggles

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 29 August 2005.
2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 2-20 is/are pending in the application.
4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5) ☐ Claim(s) _____ is/are allowed.
6) ☒ Claim(s) 2-20 is/are rejected.
7) ☐ Claim(s) _____ is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
10) ☒ The drawing(s) filed on 29 August 2005 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

In the current amendment filed by Applicants, claim 1 has been cancelled, claims 2-7 and 11 have been currently amended, and new claims 12-20 have been added. Therefore, only claims 2-20 now remain under consideration.

Drawings

Several of the previous objections to the drawings are withdrawn as being overcome by Applicants' current amendment and accompanying remarks, but the remainder of these objections not yet overcome are maintained as restated below.

The drawings are objected to because the numbering of Figures 1A-1D does not match that (e.g., Figures 1(a)-1(d), etc.) used in the specification at paragraphs [0020-0030 and 0080].

The drawings (e.g., Figure 3A, etc.) are still objected to as failing to comply with 37 CFR 1.84 because they are still inverted with respect to the claim(s) and the corresponding descriptions thereof (e.g., so that the trench upper surface is described to be the trench bottom surface as recited in line 3 of new claims 14 and 16, etc.). Note that 37 CFR 1.84(h) specifically indicates that the drawings should preferably be presented in an upright position. Since Applicants have described these drawings in the specification with directional language, Applicants must be consistent therewith by either (1) supplying corrected drawings which fully correspond to the directional language in the specification or (2) amending the specification at all applicable occurrences to correspond with the orientation of all the features that are shown in the drawings.

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The drawings are also still objected to under 37 CFR 1.83(a), because Figure 4 does not extend above auxiliary pattern line widths of 150 nm. The drawings must show every feature of the invention specified in the claims. Therefore, the entire range for the auxiliary pattern line widths from 30 nm to 200 nm (as recited by instant claims 6, 11, and also new claim 20) must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

While Applicants' current amendment and accompanying remarks have addressed most of the previous objections to the specification, this current amendment has also necessitated both restated and new objections, which are set forth below.

The disclosure is again objected to because of the following informalities: (2) at [0110] line 5, "trench 110 is designed as to shift the phase of light by 180°" should be changed to -- trench 110 is designed [[as]] to shift the phase of light by 180°--, as previously suggested; and (4) at [0120] line 1 "FIG. 50" should be changed back to the original figure number --FIG. [[50]] 5C --, both of which are necessitated by amendment.

Appropriate correction is again required.

Claim Objections

Current amendments have overcome the previous objections to the claims. Therefore, these previous objections are now withdrawn.

Claim Rejections - 35 USC § 112

The previous rejections under the first and second paragraphs of 35 U.S.C. 112 have been overcome by current amendments to the claims. However, these current amendments have also necessitated new rejections under both the first and second paragraphs of 35 U.S.C. 112, which are given below.

The following is a quotation of the first paragraph of 35 U.S.C. 112:

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The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 7-13 and 16-20 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contain subject matter, which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

In currently amended claim 7 lines 10-11, the plural "auxiliary patterns" formed by etching the layer of material "on at least one of said first and second surfaces" of the substrate includes at least one embodiment not supported by the original specification in which plural auxiliary patterns are disposed on the first surface (which remains unetched beside the trench 110 in Figure 5A) and on the second surface (at the base of the trench 110 in Figure 5A), instead of only a single auxiliary pattern being disposed on each of the first surface and/or the second surface (as shown by Figure 5C and described in the specification). This appears to represent new matter, which must be cancelled from the claim(s). Claims 8-13 depend on claim 7. However, for the purpose of this Office action and in order to advance the prosecution of this application, the above phrases in amended claim 7 lines 10-11 have been interpreted to mean --an auxiliary pattern[[s]]-- formed by etching the layer of material --on each of at least one of said first and second surfaces-- of the substrate, respectively.

In new claim 13, the recitation "wherein *exposed surfaces* of the auxiliary patterns are level" (emphasis added) is not supported by the original specification and therefore clearly constitutes new matter, which must be cancelled from the claim. It is also entirely unclear how

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both the exposed end and side surfaces of the auxiliary patterns can be level, anyway.

Accordingly, claim 13 has not been further treated on the merits.

In new claim 16 line 6, the plural “auxiliary patterns disposed on said first and second surfaces” includes at least one embodiment not supported by the original specification in which plural auxiliary patterns are disposed on the first surface (which remains unetched beside the trench 110 in Figure 3A) and on the second surface (at the base of the trench 110 in Figure 3A), instead of only a single auxiliary pattern being disposed on each of the first surface and/or the second surface (as shown by Figure 3A as described in the specification). This appears to represent new matter, which must be cancelled from the claim(s). Claims 17-20 depend on claim 16. However, for the purpose of this Office action and in order to advance the prosecution of this application, the above phrase in new claim 16 has been interpreted to mean --an auxiliary pattern[[s]] disposed on each of said first and second surfaces--.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter, which the applicant regards as his invention.

Claims 2-20 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 7 lines 5-6 and 12-13, it is unclear how plural “sides” of the trench can be defined by a single “sidewall surface of the substrate”. However, for the purpose of this Office action, “having sides” in line 5 has been interpreted to mean --having a side[[s]]-- and “the sides” in line 13 has been interpreted to mean --the side[[s]]--. Claims 8-13 depend on claim 7.

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Also, in claim 7 lines 14-16, the phrase “photoresist patterns are formed at areas corresponding to edges of the trench, and are not formed at areas corresponding to the auxiliary pattern” seems to be inconsistent with the earlier etching of the transparent substrate to form a single trench having a single side defined by a single sidewall surface of the substrate (with the single sidewall of the trench forming a single edge of the same trench). For the purpose of this Office action, this phrase has been interpreted to mean --a photoresist pattern[[s]] [[are]] is formed at an area[[s]] corresponding to an edge[[s]] of the trench, and [[are]] is not formed at an area[[s]] corresponding to the auxiliary pattern--. It is also unclear how this intended use language further limits the actual method of fabricating the phase edge phase shift mask (PEPSM) being claimed. Accordingly, for the purpose of this Office action and in order to expedite prosecution of this application, the above intended use language in claim 7 has not been considered as further limiting the actual claimed method of fabricating the PEPSM. Claims 8-13 depend on claim 7.

In claim 11 lines 1-3, the phrase “said etching a portion of the material comprises forming an auxiliary pattern having a line width of 30 nm to 200 nm on at least one of said first and second surfaces” lacks proper antecedent basis and is not entirely clear as to whether the singular auxiliary pattern is either (1) the same or (2) a different auxiliary pattern from that recited by claim 7 line 10 (as interpreted above in the rejection under the first paragraph of 35 U.S.C. 112), on which claim 11 depends. This phrase should preferably be amended to correspond with the interpretation of claim 7 line 10 (set forth above) as follows: --said etching [[a]] ~~portion of the~~ layer of material comprises forming [[an]] the auxiliary pattern having a line width of 30 nm to 200 nm on at least one of said first and second surfaces--.

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Also, in claim 11 line 5, the phrase “said sidewall surface defining the sides of the trench” is unclear as to just how a single sidewall can define the plural sides of the trench. For the purpose of this Office action, this phrase has been interpreted to mean --said sidewall surface defining the side[[s]] of the trench--.

In claim 14 lines 3-4, “the sides” lacks proper antecedent basis and it is unclear how plural “sides” of the trench can be defined by a single “sidewall surface”. For the purpose of this Office action, “the sides” in line 4 has been interpreted to mean --[[the]] a side[[s]]--. Claims 2-6 and 15 depend on claim 14.

In claim 14 lines 7-9, the phrase “wherein when the mask is used to pattern a photoresist layer, photoresist patterns are formed at areas corresponding to edges of the trench, and are not formed at areas corresponding to the auxiliary pattern” seems to be inconsistent with the single trench in the transparent substrate having a single side defined by a single sidewall surface of the substrate (with the single sidewall of the trench forming a single edge of the same trench). For the purpose of this Office action, this phrase has been interpreted to mean --wherein when the mask is used to pattern a photoresist layer, a photoresist pattern[[s]] [[are]] is formed at an area[[s]] corresponding to an edge[[s]] of the trench, and [[are]] is not formed at an area[[s]] corresponding to the auxiliary pattern--. It is also unclear how this intended use language further limits the actual structure of the phase edge phase shift mask (PEPSM) being claimed. Accordingly, for the purpose of this Office action and in order to expedite prosecution of this application, the above recitation in claim 14 has not been considered as further limiting the actual structure of the claimed PEPSM. Claims 2-6 and 15 depend on claim 14.

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In claim 16 lines 2 and 7-9, the passages “substrate having a first surface a trench” (in line 2) and “wherein when the mask is used to pattern a photoresist layer, photoresist patterns are formed at areas corresponding to edges of the trench, and are not formed at areas corresponding to the auxiliary pattern” (in lines 7-9) are both unclear. For the purpose of this Office action, the passage in line 2 has been interpreted to mean --substrate having a first surface and a trench-- (in accordance with a similar passage in claim 14 line 2) and the passage in lines 7-9 has been interpreted to mean --wherein when the mask is used to pattern a photoresist layer, a photoresist pattern[[s]] [[are]] is formed at an area[[s]] corresponding to an edge[[s]] of the trench, and [[are]] is not formed at an area[[s]] corresponding to the auxiliary pattern--. It is also unclear how the intended use language of the latter passage in lines 7-9 further limits the actual structure of the phase edge phase shift mask (PEPSM) being claimed. Accordingly, for the purpose of this Office action and in order to expedite prosecution of this application, the above passage in claim 16 lines 7-9 has not been considered as further limiting the actual structure of the claimed PEPSM. Claims 17-20 depend on claim 16.

Claim Rejections - 35 USC § 102/103

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 2-5, 7-10, 12, and 14-15 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Ham (US Patent 5,567,552).

Ham teaches a (phase edge) phase shift mask (PEPSM, claims 3-4, Figure 2, and column 2 lines 60-63) and a method of fabricating such a PEPSM (abstract, Figures 1A-1F, and column 2 lines 13-59). As shown in Figure 2, the PEPSM 10 has a transparent quartz substrate 1 in which is etched grooves or trenches 3 of width B constituting 180° phase shift regions separated by an unetched transparent 0° region of width A, wherein each trench 3 has a sidewall surface 3A and a bottom surface extending therefrom. An opaque chrome (Cr) auxiliary pattern 5B is formed at the center of each trench bottom surface by coating Cr and etching back to leave only the desired portion of Cr. When this PEPSM is used to pattern a photoresist layer, it is considered to be inherently capable and fully suitable for forming a photoresist pattern at areas corresponding to edges of each trench while not forming a photoresist pattern at areas corresponding to the Cr opaque auxiliary pattern (which specifically reads on the PEPSM and corresponding method of fabrication recited by instant claims 2, 4-5, 7, 9-10, 12, and 14-15; and further encompasses the PEPSM and corresponding method of fabrication recited by instant claims 3 and 8 for an auxiliary pattern of optical interference material that is opaque).

Claims 6 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ham (US Patent 5,567,552) in view of Randall et al. (US Patent Application Publication 2002/0094492).

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While teaching the other aspects of claims 6 and 11, Ham does not specify the line width of the opaque Cr auxiliary pattern to be 30-200 nm.

However, Cr line widths on a PSM in the instant range of 30-200 nm are well known. For example, Randall et al. teach a method of double exposure and a PSM therefore having orthogonal overlapping Cr regions 34 and 36 with critical line widths w_{34} and w_{36} , respectively, of $0.2\ \mu$ (200 nm, paragraph [0058] lines 4-6). Alternatively, a well-known "1X" mask having the same dimensions as those imaged on the resist for making a $0.16\ \mu$ (160 nm) wide gate electrode having a critical width includes a Cr opaque line width of 160 nm ([0004] lines 15-20, [0019] lines 7-11, [0038] lines 5-10, 22-26, and [0055] lines 18-22). Furthermore, gate electrode line widths on the order of $0.15\ \mu$ (150 nm) are also contemplated ([0012] lines 24-27) for a corresponding PSM having a Cr opaque line width of 150 nm (instant claims 6 and 11). It is desirable to fabricate integrated circuit device features that are as small and closely packed as possible to provide a high level of functionality and performance for the circuit, due to small feature sizes.

It would have been obvious to one of ordinary skill in the art at the time of the invention for the PEPSM and the corresponding method of fabrication taught by Ham to have employed an opaque Cr auxiliary pattern having a well-known line width of 150-200 nm (reading on the instant line width of 30-200 nm), so that the PEPSM would have features that are as small and closely packed as possible to provide a high level of functionality and performance, as taught by Randall et al., for a product (e.g., circuit device, etc.) made by patterned exposure through this PEPSM.

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Claims 16-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ham (US Patent 5,567,552) in view of either Kamon (US Patent 6,737,198) or Steinberg et al. (US Patent Application Publication 2002/0031711).

Ham does not specifically teach an additional opaque or optical interference Cr auxiliary pattern formed at the center of the unetched transparent 0° region of width A.

Kamon teaches alternative embodiments of a PSM having etched recessed phase shifters (PS) and relatively narrow light shading, opaque, or optical interference auxiliary patterns 111 centered either at the bottom of the etched PS recesses in the substrate 10 (Figure 21G, column 17 line 49 to column 18 line 16) or on top of raised portions of the substrate 10 (Figure 22E, column 18 lines 17-36).

Steinberg et al. teach an alternative embodiment of a multi-level PSM in Figure 9(e) having raised transparent mesas or pedestals 902 on a transparent substrate 905 and patterned opaque metal (e.g., Cr, etc.) regions 906 on both the raised 902 and recessed 905 areas of the substrate (paragraphs [0047, 0081]).

It would have been obvious to one of ordinary skill in the art at the time of the invention for the PEPSM taught by Ham to have employed an additional opaque or optical interference Cr auxiliary pattern formed at the center of the unetched transparent 0° region of width A as taught by either Kamon or Steinberg et al. This would be for the same reason such an opaque or optical interference Cr auxiliary pattern was used at the center of each trench bottom surface (as taught by Ham) so that when this combined PEPSM (taught by Ham and either Kamon or Steinberg et al.) is used to pattern a photoresist layer, it would be inherently capable and fully suitable for forming a photoresist pattern at areas corresponding to edges of each trench while not forming a

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photoresist pattern at areas corresponding to the Cr opaque auxiliary pattern or additional Cr opaque auxiliary pattern (which reads on the PEPSM recited by instant claims 16 and 18-19 and further encompasses the PEPSM recited by instant claim 17 for an auxiliary pattern of optical interference material that is opaque).

Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ham (US Patent 5,567,552) in view of either Kamon (US Patent 6,737,198) or Steinberg et al. (US Patent Application Publication 2002/0031711), and further in view of Randall et al. (US Patent Application Publication 2002/0094492).

While teaching the other aspects of claim 20, Ham and either Kamon or Steinberg et al. do not specify the line width of the opaque Cr auxiliary pattern to be 30-200 nm.

The teachings of Randall et al. are discussed above.

It would have been obvious to one of ordinary skill in the art at the time of the invention for the PEPSM taught by Ham and either Kamon or Steinberg et al. to have employed an opaque Cr auxiliary pattern having a well-known line width of 150-200 nm (reading on the instant line width of 30-200 nm), so that the PEPSM would have features that are as small and closely packed as possible to provide a high level of functionality and performance (as taught by Randall et al.) for a product (e.g., circuit device, etc.) made by patterned exposure of a photoresist through this PEPSM for forming a photoresist pattern at areas corresponding to edges of each trench while not forming a photoresist pattern at areas corresponding to the Cr opaque auxiliary pattern.

Response to Arguments

Several of the previous objections to the drawings have been withdrawn as being overcome by Applicants' current amendment and accompanying remarks, but the remainder of these objections not yet overcome have been maintained, as restated above.

On page 12 of 16 in Applicants' response to the previous objections to the drawings, it is stated that replacement drawings for Figures 1a-1d have been supplied, but these were not found in the amendment filed on 8/29/05. Therefore, the previous objection to these drawings has been maintained.

The drawings are still objected to as failing to comply with 37 CFR 1.84 for the reasons given above. The drawings are also still objected to under 37 CFR 1.83(a), because Figure 4 does not extend above auxiliary pattern line widths of 150 nm. On pages 12-13 of 16, Applicants have confused the previous objection of Figure 4 under 37 CFR 1.83(a) with the requirements for photographs under 37 CFR 1.84(b), but Figure 4 is not a photograph. Applicants also deny any relationship between the auxiliary pattern line widths of 30 nm to 200 nm on the phase edge phase shift mask (PEPSM) and the resulting photoresist pattern produced by the PEPSM in claims 6 and 11 (but fail to address this same problem in new claim 20). However, this is not persuasive, at least because claim 6 depends on new claim 14, claim 11 depends on claim 7, and new claim 20 depends on new claim 16. Each of claims 7, 14, and 16 specifically require that photoresist patterns are not formed at areas corresponding to the auxiliary pattern on the PEPSM. Then, claims 6, 11, and 20 further specify that the auxiliary pattern has a line width of 30 nm to 200 nm. To one of ordinary skill in the art, these claims establish a recited relationship between the line width of the auxiliary pattern on the PEPSM and

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the corresponding area or line width of the intended resulting photoresist pattern. While Figures 3A and 5C show the relative **position** of the auxiliary pattern portions, they do not show any relationship between the claimed **line width** of the auxiliary pattern portions and the line width of the resulting photoresist pattern (as shown by Figure 4 for only the smaller range of auxiliary line width from 30 nm to 150 nm). The subject matter of this application admits of illustration by a drawing to facilitate understanding of the invention. As previously stated and again set forth above, the drawings must show every feature of the invention specified in the claims (for the full claimed range of auxiliary pattern line width from 30 nm to 200 nm). Therefore, the entire range for the auxiliary pattern line width from 30 nm to 200 nm (as specifically recited by instant claims 6, 11, and also new claim 20) must be shown (e.g., in Figure 4, etc.) or the feature(s) cancelled from the claim(s).

While Applicants' current amendment and accompanying remarks have addressed most of the previous objections to the specification, this current amendment has also necessitated both restated and new objections, which have been set forth above.

Current amendments have also overcome the previous objections to the claims. Therefore, these previous objections have now been withdrawn, as stated above.

The previous rejections under the first and second paragraphs of 35 U.S.C. 112 have been overcome by current amendments to the claims. However, these current amendments have also necessitated new rejections under both the first and second paragraphs of 35 U.S.C. 112, which have been given above. In particular, Applicants remarks in reference to the previous rejection of claims under the first paragraph of 35 U.S.C. 112 as lacking enablement for "an optical interference material" have been found persuasive due to Applicants' admission at the bottom of

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page 14 of 16 that chromium is an example of an optical interference material for the auxiliary pattern 120 (as supported in the original specification at paragraphs [0090 and 0095]).

Applicants' other arguments with respect to the claims have been considered but are moot in view of the new ground(s) of rejection that have been necessitated by current amendments to the claims.

Conclusion

Applicants' amendment necessitated the new and restated objections and ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

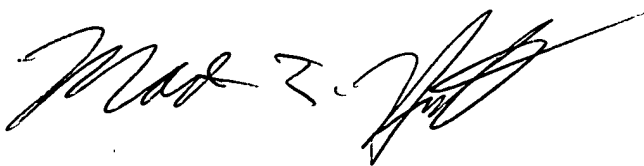
A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to John Ruggles whose telephone number is 571-272-1390. The examiner can normally be reached on Monday-Thursday and alternate Fridays.

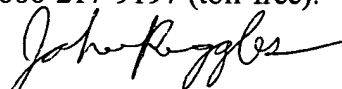
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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Huff can be reached on 571-272-1385. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



MARK F. HUFF
SUPERVISORY PATENT EXAMINER
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John Ruggles
Examiner
Art Unit 1756